

for we must, I think, recognise hereabouts a younger Boulder Clay as distinct from the "Chalky Boulder Clay" of the Herts and Essex plateau, along with interglacial deposits consisting largely of the outwashings of the older Boulder Clay.

It is easy to understand that a great latitudinal range of variations of climatic conditions in these lowland regions of south Britain would be necessarily contemporaneous with the more definitely marked *altitudinal* variations of the snow-line in the Alpine regions of Britain and Europe, whether from regional subsidence or otherwise. One may venture to say that we have here a record contemporaneous perhaps with that of the "Hessle Boulder Clay" or the "Purple Boulder Clay" (Brit. Mus. "Guide to the Stone Age," p. 8), and with the "Würm" (vierte Vergletscherung) of Alpine glaciation (Credner, "Geologie," tenth edition, p. 739); also Werth, *Globus*, Band xcvi., No. 15, p. 231).

A. IRVING.

Bishop's Stortford, August 9.

### The Anti-kathodes of X-Ray Tubes.

THE special requirements to be fulfilled by materials adapted for use as anti-kathodes are somewhat exacting, and the range of such materials is therefore limited. It is, further, unfortunate that the platinum, tantalum, &c., are in general costly, and that the expense of X-ray tubes is hence, considering their life, high. In casting about for some means of avoiding this difficulty it has occurred to me that carborundum, a material now quite familiar as an abrasive, might be a suitable facing for the anti-kathode. Carborundum, being a product of the electric furnace, is exceedingly refractory; electrically it is a very bad conductor. Messrs. Helm have constructed for me a tube fitted with an anti-kathode from a square inch of carborundum grinding slip, and I have used this tube, so far as my limited laboratory means allow, with perfectly successful results. My coil is only of low power, and I have no means of making any comparative tests of a quantitative type. It seems likely, on theoretical grounds, that the emission from such a tube would be of low penetrative power, but, so far as I can judge, the tube does not seem to pass so readily into the hard condition.

My object in this letter is to bring this matter to the notice of others who are in a position to test the properties of carborundum as an anti-kathode material. If its radiation is of a low penetrative type, such a tube might have advantages in certain superficial treatments in electro-therapeutics, e.g. ringworm of the scalp, &c. I should be greatly interested in hearing of any experimental trial.

J. SCHOFIELD.

Technical School, Keighley.

### The Action of Carbon Dioxide on Litmus.

I WRITE to direct attention to the inaccuracy of a common statement in elementary text-books describing the action on litmus of carbon dioxide in solution.

It is generally stated that the action of carbon dioxide is to turn litmus "wine red," while the fact is that carbon dioxide dissolved in distilled water turns neutral litmus red, just like any other acid.

The cause of the wine-red colour usually obtained is the presence of alkaline bicarbonates as impurities. That this is the case can be seen by adding a drop of ammonia or of sodium carbonate solution to the carbon dioxide solution, when the colour changes, first, from red to blue, and then, after an interval which depends on the amount of alkali added, to the wine red usually associated with the action. A weak solution of lime water acts similarly, and this would seem to give the genesis of the error, as if hard waters are used to make up the solutions the wine-red colour is produced.

The point may not be of the greatest consequence, but it does not seem to be generally known, and the columns of NATURE would seem to offer the best means of disseminating, to those whom it chiefly concerns, the knowledge of another "text-book" error.

M. M'CALLUM FAIRGRIEVE.

The Edinburgh Academy, July 26.

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### THE BUSHONGO: AN ETHNOGRAPHICAL STUDY OF THE CENTRAL CONGOLAND PEOPLES.<sup>1</sup>

IT is difficult to write an adequate review of this work, the result of Mr. Emil Torday's last expedition to central Congoland (1907-9), an expedition in which he was accompanied by Mr. M. W. Hilton-Simpson and a very clever painter, Mr. Norman H. Hardy. Mr. Torday has had the advantage of the collaboration of Mr. T. A. Joyce, of the British Museum and the Royal Anthropological Institute, and Mr. Joyce has been able to bring to bear on the compilation his exceptional knowledge of negro arts, implements, customs, religious beliefs, morals, laws, social life, games, songs, and folklore.

The water-colour drawings by Mr. Norman H. Hardy are, beyond all question, the best that have ever been executed so far in Negroland. They have the absolute fidelity of photographs, with at the same



FIG. 1.—A masked dancer of the Bangongo.

time an appreciation of composition and colour which makes them really works of art. Special instances to justify this praise are:—Plate 5, a masked dancer of the Bangongo (Fig. 1); plate 7, female dancers amongst the Bangongo; plate 8, a Bangongo embroideress; plate 9, a portrait of a Bangongo blacksmith; plate 11, Shika, a young girl of the Isambo tribe; plate 12, a young Bashilele man, with the profile of an ancient Egyptian (Fig. 2); and amongst the black-and-white drawings, plate 17, a study of a native engaged in the manufacture of vegetable salt (Fig. 3), together with certain interiors of houses. Three of the plates referred to are here reproduced in a reduced form.

<sup>1</sup> 'Notes Ethnographiques sur les peuples communément appelés Bakuba, ainsi que sur les peuplades apparentées. Les Bushongo.' By E. Torday and T. A. Joyce. Annales du Musée du Congo Belge. Publiées par la Ministère des Colonies. Ethnographie, Anthropologie—Série III: Documents Ethnographiques concernant les populations du Congo Belge. Tome II.—Fascicule I.—Coloured illustrations by Norman H. Hardy. Published by the Museum of the Belgian Congo, Brussels.

It must have been a subject of regret to Mr. Torday that Mr. Norman Hardy's health gave way, and that he was not able to remain with the rest of the party during the whole of the expedition. Otherwise, his album of absolutely truthful pictures of life and scenery in the heart of Congoland would have been even more complete than it is. Of course, the great part of the praise which critics may bestow on this splendid ethnographical work (which, I believe, is to be completed in a further volume), will be awarded to Mr. Emil Torday, who conceived the whole plan of the expedition, is exceptionally well versed in the study of the Negro, took the greater part of the photographs which so effectively illustrate this monograph on the central Congoland peoples, and has shown himself able for some ten or eleven

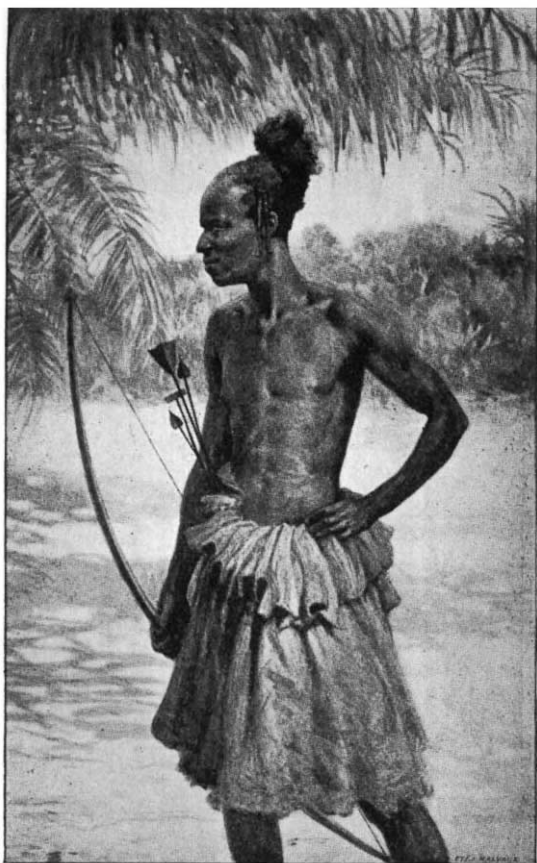


FIG. 2.—A young Bashilele man (with an "ancient Egyptian" profile.)

years past to penetrate remote parts of British Central Africa and of the Belgian Congo, where other Europeans would have found it dangerous and perhaps impossible to proceed, because they did not possess Mr. Torday's unique gift of discriminating sympathy with and understanding of the savage, the semi-savage, and the half-civilised negroid.

In the region more especially covered by this monograph on the Bushongo, a few great explorers, like Wissman, Wolf, von François, George Grenfell, and perhaps most notably the American missionary, Mr. S. P. Verner, have crossed Mr. Torday's paths, and owing to their writings we were not entirely ignorant of the existence of this remarkable "Bushongo" culture in central Congoland. The Bushongo—this seems a strange plural for a more or less Bantu people, but Mr. Torday is so accurate in other matters

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that we presume he has interpreted it correctly—were hitherto known as the Bakuba, and as such attracted markedly the attention of Grenfell and Verner. Mr. S. P. Verner, in a rather *décousu* book, which he published some years ago on his travels in Congoland, gave some very good descriptions of this aristocratic race or ruling caste, but it is possible that in his enthusiasm for them he somewhat exaggerated their physical approximation to non-Negro, Caucasian types. He made them out, apparently, to be lighter in skin-colour and more European in features than they are actually. Yet from Mr. Torday's photographs and Mr. Hardy's paintings one realises that there is some distinct infiltration of Caucasian strain in the Bushongo or Bakuba, and in such of the surrounding populations as those with whom they have mingled their blood. Livingstone noticed this more than sixty years ago in regard to the Baluba and

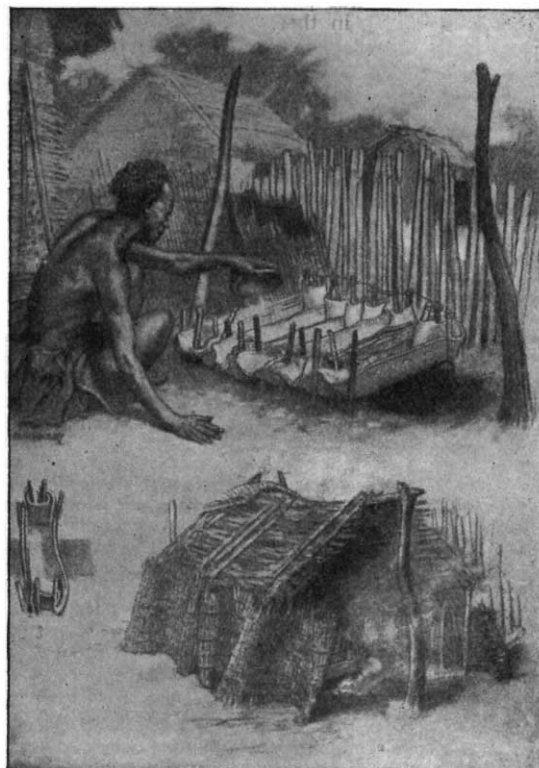


FIG. 3.—Native engaged in manufacture of vegetable salt.

Alunda, commenting repeatedly on their "Egyptian" profiles.

That the Bushongo brought with them at some unknown date an exotic culture into the heart of the Congo Basin, and that with their strain of Caucasian blood they further inspired the local negroes to evolve an art which in some respects is peculiar to central Congoland, cannot be open to doubt when all the facts and traditions collected by Mr. Torday are passed in review. At the present day the Bushongo speak a somewhat degraded Bantu language, much less purely Bantu than the beautiful speech of the Baluba, or than the Kongo tongue of western Congoland, or even the Bangala of the northern Congo. But in former times the speech of the ruling caste of the Bushongo was known as the Lumbila. This language ceased to be spoken about sixty years ago, but Mr. Torday was able to collect examples of it, and submit them to the writer of this review. These words of Lumbila



are repeated in the work in question alongside the degraded Bantu dialect now spoken by the Bushongo. It is at once evident that the Lumbila is not a Bantu language, though it undoubtedly possesses a few borrowed words of Bantu origin. So far as I have been able to compare the fragments of this tongue with other groups of African speech, I find the only clear indications of relationship to be with certain languages of the Shari Basin, and perhaps with that vague group of Sudanese tongues to which belong the non-Bantu languages of the Upper Mubangi. Mr. Torday points out on p. 43 that the Lumbila name for river is Chari (in modern Bushongo, Nchale), which certainly recalls the widespread term for lake or river which we find in Shari, Chade, Chada (both of them terms for Lake Chad and for the River Benue).

I have pointed out in my own work on "George Green and the Congo," that this central Sudan word for a great water has penetrated far into the Congo Basin, reappearing in the name Nzadi, often applied to the western Congo, and the Portuguese Zaire. According to tradition, when the Bushongo arrived in central Congoland from their northern home they were a naked people, accustomed to eat durra corn and other millet-like grains unknown to the forest regions. Their ancient nudity would ally them more to the central Sudan and Nilotic peoples, for, strange to say, however barbarous and savage may be all the peoples of Congoland, even the Pygmies, absolute nudity in the male is almost unheard of, and is reprehended. The word Bushongo, according to Mr. Torday, means the people of the "Shongo," and "Shongo" is apparently the name for the iron throwing-knife, which was brought by the Bushongo with them in their immigration, and which only penetrates into the more northern half of Congoland. This throwing-knife in its origin is only a modification of the wooden boomerang, and in its metal form seems to have originated in the Tibesti Mountains. Indeed, there is a good deal in the work under review, as well as in the reviewer's own researches, which tends to indicate a direct southward migration into the heart of Congoland from Kanem and Tibesti; and it is probable that from this direction comes the slight Caucasian infiltration of blood, which, as the Tibesti region of the negroid Teda or Tibu peoples, was probably Caucasianised from the direction of ancient Egypt, would explain the striking outcrop of Pharaonic face outlines occurring and recurring ever and again amongst the more aristocratic types in central and southern Congoland outside the great forests.

According to a Bushongo tradition, the first chiefs of the Bushongo (who are at present settled between the Sankuru and the Kasai) were white or semi-white, but the term white is constantly applied by the negroes to races of pale-yellow or reddish skin, like the Arabs and the Fula. Mr. Torday thinks that the southward march of the Bushongo may have been part of the same series of racial convulsions as the invasion of northernmost Congoland by the Azande (Nyam-nyam). The Bangongo and Bangende tribes, nowadays so much affiliated with the Bushongo, would seem traditionally to have arisen from a mingling north of the Sankuru River between the invading Bushongo and the pre-existing Basongo-meno, and there is obviously a relationship between the Bushongo and the Bashilele, and even an infiltration of Bushongo elements (the reviewer would add) amongst the Baluba and Alunda. Perhaps even the civilisation of the old Kingdom of Kongo, founded by a legendary hunter named Kongo, may have a Bushongo origin. It is interesting to note that a totally different Bakongo people exists in the vicinity of the Bushongo territory in central Congoland, several hundred miles separated

from the better-known Bakongo of the region between the Crystal Mountains and the Atlantic Ocean. The original word Kongo seems to have meant a metal spear, and consequently a hunter, and may even be related to the term Shongo, applied to the throwing-knife.

An interesting point made by Mr. Torday was the apparent establishment of the fact that when the pygmy Batwa, of the dense forests, have been established for some generations outside these forests in the open country under the protection of the Bushongo, their stature sensibly increased, so that at last their descendants were indistinguishable in physique from the other short-legged, long-armed, prognathous forest negroes of nearly normal stature.

In a succession of chapters after the first (which deals with the origin and relationships of the Bushongo) is given a full account of the elaborate government and administration of justice amongst the Bushongo and allied peoples. The long list of court functionaries reminds one of Uganda and other equatorial African kingdoms. The social life of the Bushongo, their morality (which in some respects is very high—see the admirable moral precepts set forth on pp. 85-6), their ideas of property and inheritance, commerce, sports, dances, warfare, distinctions of relationship, and forbidden degrees of affinity in marriage, their sexual life, religion, magic, funeral customs, industries, and arts, domestic animals, agriculture, building, costume, mutilation, skin decoration (tattooing), folklore, and languages are fully described and illustrated. A great deal of space is given up to the description of the really wonderful arts and industries of the Bushongo and allied peoples—their wood-carving and their beautiful woven cloths, their metal-work (very elaborate), and pottery. The linguistic information concerning the Bushongo, Bakongo, Bangongo, Bangendi, and Basongo-meno languages, will be of great interest to students of the Bantu family. This work is, in short, splendidly complete, with one exception. It is ethnological rather than anthropological, and it would have been additionally interesting if Mr. Torday had been able to include photographs of the many types of skull that he has collected, and other pictures, measurements, and descriptions, showing more clearly the physical conformation of the various peoples he has otherwise described so minutely. From the various numerous photographs and pictures one is able to deduce to some extent what is not actually described in words—namely, the physical features of these races of central Congoland; and it is interesting to note here and there a type of physiognomy occurring which is also met with on the northern Congo and in the central Sudan, namely, quite a Caucasian type of face amongst the men, with a fairly abundant growth of beard and moustache, very bushy head-hair (except where this has been removed artificially), and little of the negro but the dark skin.

H. H. JOHNSTON.

#### THE FRENCH ANTARCTIC EXPEDITION.<sup>1</sup>

ONE of the problems of most far-reaching importance in the Antarctic is the nature of the southern border of the Pacific, for while we remain in complete ignorance of its structure no theory of the formation of the Pacific, the greatest geographical unit on the globe, can be more than a provisional hypothesis.

Cook's description of his view from his furthest south in the Southern Pacific suggests that he had

<sup>1</sup> Institut de France: Académie des Sciences. Rapports Préliminaires sur les Travaux exécutés dans l'Antarctique par la Mission commandée par M. le Dr. Charcot de 1903 à 1910. Pp. x + 104. (Paris: Gauthier-Villars, 1910).